

CLAIMS

I CLAIM:

1. A method to transform a non self-describing segment of a transport protocol into a self-describing segment for an upper layer protocol, the method comprising the steps of:

aligning a framing header with the non self-describing segment; and

putting segment description information in the framing header.
2. The method of claim 1 further comprising the step of limiting an upper layer protocol data unit size to the smaller of a maximum transport segment size and a size that will fit within the non self-describing segment.
3. The method of claim 2 wherein the non self-describing segment is being sent on a connection to a destination address, the method including the step of terminating the connection if the upper layer protocol data unit is greater than the smaller of a maximum transport segment size and the size that will fit within the non self-describing segment.
4. The method of claim 1 further comprising the step of putting a destination buffer id and offset in the non self-describing segment.
5. The method of claim 1 further comprising the step of putting a destination buffer id and a destination address in the non self-describing segment.

6. A computer-readable medium having computer executable instructions for performing steps to transform a non self-describing segment of a transport protocol to a self-describing segment for an upper layer protocol, the steps comprising:

obtaining segment description information; and

putting the segment description information in one of a header aligned with a header of the non self-describing segment and the header of the non self-describing segment.

7. The computer-readable medium of claim 6 wherein the segment description information includes a data size of data in the non self-describing segment, the computer-readable medium having further computer-executable instructions for performing the step of generating an error message if the data size exceeds the smaller of a maximum transport segment size and a size that will fit within the non self-describing segment.

8. The computer-readable medium of claim 6 having further computer-executable instructions for performing the step of putting zero-copy information in the non self-describing segment.

9. The computer-readable medium of claim 6 having further computer-executable instructions for performing the step of putting a destination buffer id and a destination address in the non self-describing segment.

10. The computer-readable medium of claim 6 having further computer-executable instructions for performing the step of putting a destination buffer id and a data size and offset in the non self-describing segment.

11. A method to transform a non self-describing segment of a transport protocol to a self-describing segment for an upper layer protocol comprising the steps of:

- obtaining segment description information;
- putting the segment description information in a header aligned with a header of the non-self describing segment or the header of the non self-describing segment.

12. The method of claim 11 wherein the segment description information includes a data size of data in the non self-describing segment, the method including the step of fragmenting the data into self-describing segments if the data size exceeds the smaller of a maximum transport segment size and a size that will fit within the non-self describing segment.

13. The method of claim 11 further comprising the step of putting zero-copy information in the non self-describing segment.

14. The method of claim 11 wherein the step of putting segment description information in the header includes the step of putting a destination buffer id and a destination address in the header.

15. The method of claim 11 wherein the step of putting segment description information in the header includes the step of putting the data size and an offset in the non self-describing segment.

16. A method of sending data between an upper layer sender and an upper layer receiver through a transport having a transport protocol that sends data in at least one transport segment, the method comprising the steps of:

determining if the at least one transport segment is a non self-describing segment;

if the at least one transport segment is a non self-describing segment:

obtaining segment description information;

aligning a framing header with the at least one transport segment;

putting the segment description information in the framing header;

putting the data into the at least one transport segment; and

sending the at least one transport segment to the upper layer receiver.

17. The method of claim 16 wherein the transport segments have a transport segment size and wherein the step of putting the data into the at least one transport

segment includes fragmenting the data into self-describing transport segments if a size of the data is larger than the transport segment size.

18. The method of claim 16 wherein the data comprises at least one upper layer protocol data unit and wherein the step of putting the data into a transport segment comprises the step of putting an integral number of upper layer protocol data units into the a transport segment.

19. The method of claim 16 further comprising the step of generating an error message if the data is larger than the smaller of a maximum transport segment size and a size that will fit within the transport segment.

20. A network interface card comprising:

- memory buffers for receiving transport segments; and
- a processing unit in communication with the memory buffers, the processing unit comprising
 - a first module for detecting if a transport segment of a transport segment is a non self-describing segment; and
 - a second module for obtaining segment description information and putting the segment description information in one of a header aligned with a non self-describing segment header and the non self-describing segment header.

21. The network interface card of claim 20 wherein the processing unit aligns the header with the non self-describing segment header.

22. The network interface card of claim 20 wherein the processing unit limits an upper layer protocol data size to the smaller of a maximum transport segment size and a size that will fit within the non self-describing segment.

23. The network interface card of claim 20 wherein the transport segments have a transport segment size and wherein the processing unit fragments data into a plurality of transport segments if a size of the data is larger than the transport segment size.

24. A network interface card comprising:
memory buffers for receiving transport segments; and
a processing unit in communication with the memory buffers, the processing unit performing the steps of:

detecting if a transport segment of a transport protocol is a non self-describing segment; and

if the transport segment is a non self-describing segment:

obtaining segment description information; and

putting the segment description information in one of a header

aligned with a non self-describing segment header and the non self-describing segment header.

25. The network interface card of claim 24 wherein the processing unit aligns the header with the non self-describing segment header.

26. The network interface card of claim 24 wherein the processing unit limits an upper layer protocol data size to the smaller of a maximum transport segment size and a size that will fit within the non self-describing segment.

27. The network interface card of claim 24 wherein the transport segments have a transport segment size and wherein the processing unit fragments data into a plurality of transport segments if a size of the data is larger than the transport segment size.

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